1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

the point where the Kárákoram merges into the Hindu Kush. The source of the Parasot is in 36° 10′ N. latitude, and 72° 40′ E. longitude, on the eastern face of the range which gives rise to the Chitral, or Kunar river. After a separate course of seventy-five miles each, the two streams join above Roshan, in latitude 36° 20′, and longitude 73° 30′, and take an easterly course for twenty-five miles, to Gakuch, where they are joined by the Chator-Kun river, from the north. Thence to the town of Gilgit its course is east-south-east, for fifty miles, below which it receives the joint tribute of the Hunza-Nager rivers. It continues the same course for about thirty miles further, to its junction with the Indus, below the defile of Makpon-i-Shang-Rong. The general direction of the stream is to the east-south-east, and its whole length not less than 180 miles. The minimum discharge is probably 2,000 cubic feet, or even more.

The Astor, or Hasora river, falls into the Indus in latitude 35° 30′, and longitude 74° 35′. It rises to the east of the great mountain of Dayamur, and takes a northerly course of about 100 miles.

VI.—CATACLYSM OF THE INDUS.

Since Moorcroft visited Ladák, there have been no less than three inundations of the Indus, of which the last and greatest occurred in 1841. Vigne was the first to make known the second of these cataclysms, which, from the information of the people, he attributed to its right cause,* the bursting of a glacier in the upper course of the Shayok river. In 1812, when Izzet Ullah went from Lé to Yarkand, he travelled up the Shayok

* Kashmir. II. p. 362.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731
133X

river, from its great western bend to its source in the Kárákoram mountains; and in 1822, when Moorcroft was at Lé, the road by the Shayok was still clear. The information which I obtained regarding the Shayok or Khundan glacier, dates the first stoppage of the river in the fourth year after Moorcroft left Ladák, and in the same year that Jehangir Khoja came from Yarkand, or in A.D. 1826. The river was dammed only for a short time, but the road was permanently obstructed. The second cataclysm happened in 1833, when, to use Vigne's account, "the protecting glacier gave way, and the mighty flood, no longer confined, rushed down the valley of the Shayok, destroying every village that came within its reach." The third cataclysm occurred in 1841, when the gallant Syâm Sing Atáriwala (who fell at Sobraon) was encamped in the bed of the river. Suddenly down rushed the wave of the inundation, thirty feet in height, and the whole camp took to flight: most of the men were saved, but the baggage, camp equipage, and guns, were swept away.

The cataclysm of the Val de Bagnes, a small feeder of the Rhone, is the only great flood of this kind of which I can find any account; but the Val de Bagnes is scarcely five miles in length, while the glacier of the Khundan river is not less than 800 miles from the fort of Attock, past whose walls the flood rushed in one tremendous wave about 30 feet high, and continued its overwhelming course to the Indian Ocean, a distance of 1,750 miles.

> Who that from Alpine heights his laboring eye
> Shoots round the wide horizon, to survey
> Indus or Ganges rolling their bright floods
> Through mountains, plains, through empires black with shade,
> And continents of sand, will turn his gaze
> To mark the windings of a scanty rill? AKENSIDE

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731
133X

The Val de Bagnes is a petty brook, while the Khundan is a mighty river, scarcely inferior to the Indus itself at their junction above the fort of Skardo.

As a magnificent natural catastrophe on so grand a scale as that of the cataclysm of the Indus is worthy of the most particular examination, I trust that the following details will prove both interesting and valuable.

When Vigne and Dr. Falconer* were at Skardo in 1837, they heard that the Shayok or Khundan river had been often "blocked up by avalanches and masses of ice," and that a flood had occurred not many years before. Both of these travellers heard of a lake in the upper course of the Shayok river, but as Mir Izzet Ullah does not mention it, I conclude that my information regarding the origin of the lake is correct. In two different parts of the Shayok or Khundan river, above and below Sassar, the bed of the stream is completely spanned by enormous glaciers. The upper glaciers above Sassar were seen by Dr. Thomson in 1848. They had descended from two lateral ravines on the western bank, and had been thrust right across the bed of the river by their own weight. But the lower glaciers on the Khundan are those to which my informants attributed the obstruction of the river, and they were unanimous in ascribing the flood to the long stoppage and sudden escape of the accumulated waters of the Khundan. The exact position of the great glacier is known within a few miles. It is situated somewhere between Sassar and the junction of the Chang-Chhenmo, and as the distance between these points is only 50 miles, we may place the glacier with tolerable certainty at about 30 miles below Sassar, and 20 miles above the junction of

* Journal Asiatic Soc. Bengal, X. p. 617.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731 133* the Chang-Chhen-mo. This part of the course is now quite inaccessible, owing to the accumulated mass of ice and snow. The high road from Lé to Yarkand formerly 731 ascended the bed of the Khundan or Shayok river the 133* whole way to its source in the Kárákoram mountains; 491 but since the obstruction of the channel, the road now takes a more westerly direction up the Nubra river, and then crosses a lofty pass to Sassar on the Khundan. At this point it again leaves the Khundan, on account of the upper glaciers seen by Dr. Thomson, and proceeds over a rugged and elevated tract to the head-waters of the river.

133* In these cold and lofty regions, almost every ravine is filled with a glacier, which, except during a very warm summer, never moves, but is bound to the rocks every night by the icy chains of frost. A glacier is melted on its under surface by the higher temperature of the soil, and on its upper surface by the thawing of the snow under the direct rays of the sun. The heated stones that lie on the top form hollows and clefts that admit the external air, and little rills of water trickle over the sides in all directions. The glacier is thus furrowed by holes, penetrated by cracks, and undermined below, until it becomes narrower than the ravine which contains it. It then descends by its own weight, and is either rent to pieces by unequal pressure, or checked by some opposing obstacle. In a very warm and dry summer the glaciers in the lateral ravines of the Khundan would be so much diminished by melting and evaporation, that they would be impelled onwards by their own gravity right across the channel of the river. This I suppose to have been the case towards the end of September 1826, from which time the channel of the Khundan river has

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

never been clear, and the accumulated waters have formed a lake of considerable size, to which the people have given the name of *Nubra Tsho*, or the Nubra Lake. The accounts which Vigne received were "various and most conflicting, but all agreed that it was very large;" and he concluded that it might be "three or four miles in length and less than a mile in width." My informant, who had seen the lake, said it was four or five kos (eight or ten miles) in length, and less than a quarter of a kos (half a mile) in breadth; and such is the shape, that I should suppose it must take in the confined channel of the Khundan river.

In 1833* this barrier was burst, and the accumulated waters rushed down the valley of the Shayok, destroying every village within their reach; from Nubra to Skardo, a distance of 120 miles, the flood-wave descended in a single day, at the rate of ten miles an hour; and the marks of its fury were still to be seen at Skardo in 1837. So well was the cause of this inundation known to the people, that it was believed "that the same terrific visitation might be expected to occur again at no very distant period."†

The expected cataclysm occurred in June 1841, but it was immensely greater in volume and more devastating in its effects than the previous inundation of 1833.

During December 1840 and January 1841, the Indus was observed to be unusually low between Torbela and Attock.‡ In February and March it became lower, and

* Two different informants fixed the date as follows:—one said fourteen years before 1847, that is in 1833; the other said "just before Zorawár Sing invaded Ladák." As the invasion took place in 1834, the cataclysm may be dated in 1833.

† Vigne's Kashmir, II. p. 362.

‡ Major James Abbott. Journal Asiat. Soc. Bengal, XVII. p. 230.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731 was even fordable not far above Attock; but in April and May, though still very low, it was no longer fordable, as the depth of the stream had been much increased by the melted snows. Early in June the barrier was burst, and the collected waters of nearly six months rushed with overwhelming violence down the narrow valley of the Shayok, sweeping everything before them. Houses and trees, men and women, horses and oxen, sheep and goats, were carried away at once, and all the alluvial flats in the bed of the river, which had been irrigated with laborious care, were destroyed in a moment. This happened in the middle of the month of Jyeth in the Sambat year 1898, or about the 1st June, A.D. 1841.

According to the testimony of the people of Chulung and Tartuk, on the western boundary of Chhorbad, the wave of inundation passed their villages at two o'clock in the afternoon. As these villages stand on opposite sides of the river, and are ten miles apart, the concurrence of testimony may be taken as a proof of its correctness. Two days afterwards, and exactly at the same hour, the flood passed by Torbela, a distance of 550 miles. The rate is 11·4583 miles per hour, or 16·81 feet per second, being only just half that of the flood-wave of the Val de Bagnes in 1818 at its first burst into the valley of the Rhone. The fall from the Khundan glacier to Torbela is 16,000 feet, or just 20 feet per mile.

The devastating effects of this terrible flood were still quite fresh in 1847. At Tertse, one of the widest parts of the valley, they could be traced to a height of more than 20 feet above the stream, where straws and twigs were massed together in lines two or three feet broad, and upwards of half a mile from the channel of the river in October 1847. But the most striking effect of the flood

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

was the entire absence of trees in the valley of the Shayok, while the lateral valley of Nubra was full of trees upwards of a hundred years old.* There were of course many young trees in the bed of the Shayok, but they were the growth of only a few years. At Surmu and at other places in the Khapolor district, numbers of fruit-trees were observed standing amidst large tracts of sand and gravel. 731

The following table shows the loss of life and property in most of the villages along the Shayok from the junction of the Nubra river to the fort of Skardo.

Districts.	Houses.	People.	Horses.	Oxen.	Sheep, Goats.	Khals of Land.	Trees.
Nubra	19	83	18	114	1,040	178	—
Chhorbad ...	140	8	—	—	—	364	140
Khapolor ...	163	1	1	4	—	859	—
Keris	20	—	—	—	—	127	4,900
Skardo	9	—	—	—	—	107	1,190
Parguta ...	—	—	—	—	—	10	1,200
Total ...	351	92	19	118	1,040	1,645	7,430

From this list we learn that the principal loss of life occurred in the Nubra district, where the valley of the Shayok expands to about half a mile in breadth. There the shepherds and herdsmen, with their flocks and herds, were overwhelmed in the midst of the open plain, without a chance of escape. In the lower part of the valley, where the channel is confined, and where the villages are generally built high above the stream, there was no loss of life. Even amongst the low-lying hamlets in the bed of the river, the loss of life was trifling, for the distant roar of the rushing waters was a sufficient warning to

* This fact was communicated to me by Dr. Thomson.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731 the people who had beheld the inundation of 1833, and with a few exceptions they all made their escape up the mountains.

The effect of the inundation at Torbela has been so graphically described by Major James Abbott from the lips of an eye-witness, Ashraf Khan, of Torbela, that I will quote it entire.* "At about 2 P.M. a murmuring sound was heard from the north-east among the mountains, which increased until it attracted universal attention, and we began to exclaim, 'What is this murmur? Is it the sound of cannon in the distance? Is Gandgarh bellowing? Is it thunder?' Suddenly some one cried out, 'The river's come.' And I looked and perceived that all the dry channels were already filled, and that the river was racing down furiously in an absolute wall of mud, for it had not at all the colour or appearance of water. They who saw it in time easily escaped. They who did not, were inevitably lost. It was a horrible mess of foul water, carcases of soldiers, peasants, war-steeds, camels, prostitutes, tents, mules, asses, trees, and household furniture, in short, every item of existence jumbled together in one flood of ruin; for Raja Gulab Sing's army was encamped in the bed of the Indus at Kulai, three kos above Torbela, in check of Painda Khan. Part of the force was at that moment in hot pursuit, or the ruin would have been wider. The rest ran, some to large trees which were all soon uprooted and borne away; others to rocks, which were speedily buried beneath the waters. Only they escaped who took at once to the mountain-side. About five hundred of these troops were at once swept to destruction. The mischief was immense. Hundreds of acres of arable land were licked

* Journal Asiat. Soc. Bengal, XVII. p. 231.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731

up and carried away by the waters. The whole of the Sisu-trees which adorned the river's banks, the famous bargat-tree of many stems, time out of mind the chosen bivouac of travellers, were all lost in an instant."

Throughout the mountain-course of the Indus the devastation caused by this terrible flood in the low lands along the bank of the river was complete. All the cultivated lands were swept away, and not even a single tree was left standing to mark the spot where careful tillage and laborious irrigation had for hundreds of years wrung luxuriant crops from the thirsty soil. The fields, the houses, and the trees, were all overwhelmed in one common ruin; while man and the animals which he has domesticated, horses and oxen, sheep and goats, generally managed to escape.

The ruin caused by this awful inundation in the bed of the Indus, between Torbela and Attock, was so overwhelming and so vast, that "it will take hundreds, if not thousands of years, to enable time to repair, with its healing hand, the mischief of that terrible hour. The revenue of Torbela has in consequence dwindled from 20,000 to 5,000 rupees. Chach has been sown with barren sand. The timber, for which the Indus has been celebrated from the days of Alexander until this disaster, is now so utterly gone, that I vainly strove throughout Huzara to procure a Sisu-tree for the repair of the field-artillery carriages. To make some poor amends, the river sprinkled gold dust over the barren soil, so that the washings, for several successive years, were farmed at four times their ordinary rent."*

Opposite Attock, the waters of the Kabul river were checked and forced backward for upwards of twenty

* Major James Abbott.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731 miles, by the mighty wave of inundation. The fort of Akora, and the village of Messabanda, were overthrown; and when I saw them in January 1848, were mere scattered heaps of ruin.

731 133 As everything connected with this tremendous inundation must be interesting, I have attempted to ascertain, approximately, the mass of the accumulated waters in the Nubra Tsho, or Lake, formed by the glacier barrier, as well as the mass and height of the cataclysmal wave. In calculating the accumulation of water, I have estimated the usual winter discharge of the Khundan river at 800 cubic feet, or less than one-half of the discharge at its confluence with the Indus. The increased discharges in April and May are based upon the known rates of increase in the discharge of the Indus, which have already been given. The accumulation began in December.

Date.		Velocity.	Accumulation.
December	1840	800 cubic ft. per sec.	1,249,920,000 cubic ft.
January	1841	800 „ „	1,249,920,000 „
February	„	800 „ „	1,128,960,000 „
March	„	800 „ „	1,249,920,000 „
April	„	2,000 „ „	5,064,000,000 „
May	„	4,800 „ „	12,918,320,000 „
			22,861,040,000 „

From this amount a considerable deduction must be made for loss by evaporation and percolation. I do not, therefore, estimate the whole mass of accumulated waters at more than 20,000,000,000 cubic feet. But even this would be sufficient to form a lake twelve miles in length, with an average breadth of 526 yards, or 1,578 feet, and an average depth of 200 feet. The surface of the lake would

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

have been half a mile or more in breadth, and the depth at the lower end, against the glacier, would have been 400 feet. As the fall in this part of the bed of the river is somewhat less than thirty-five feet, a lake of this depth would be exactly twelve miles in length.

The bursting of the barrier was, I have little doubt, caused by the cutting powers of the overflowing waters, which must quickly have worked enormous clefts in the outer face of the glacier. In a few days these clefts would have been worn deeper and deeper, until the icy mass at length gave way under the mighty pressure of the vast liquid body. Then the imprisoned waters burst forth with a roar of exultation, lashing themselves into foam against the rocks, careering madly from side to side, and sweeping all things before them in the wild might of their untamed strength.

According to the information given by the people of Chulung, on the Shayok, the flood was three whole days in passing off; two days in full height, and the third day considerably decreased; on the fourth day the flood had mostly gone by, but the stream was still much swollen. The following calculation shows the daily discharge of water for each of the three days of flood, with a small allowance for the fourth day.

			Daily discharge.
1st day at	100,000	cubic feet per second,	8,640,000,000 cubic feet.
2nd „	80,000	„ „	6,998,400,000 „
3rd „	40,000	„ „	3,499,200,000 „
4th „	20,000	„ „	1,728,000,000 „
Total discharge in four days ...			20,866,800,000 „
Total mass of accumulated water,			20,000,000,000 „

By dividing the maximum discharge of 100,000 cubic feet per second by the ascertained velocity of 11·4583

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731 miles per hour, or 16·81 feet per second, we obtain 5,948 square feet as the sectional area of the cataclysmal wave. From this I have deduced the rise of the river in different parts of the channel according to its width. These heights, however, do not give the actual rise of the water, which must always have been greater immediately above every narrow part of the channel.

	Width of River.	Rise.
Above Tertse	250 feet broad	23·79 feet.
Near Turtuk	100 „ „	59·48 „

The height of the flood below Tertse was ascertained to have been between twenty and thirty feet, by the broad lines of straw and twigs which marked the extreme limit of the inundation. In the open plain of Unmâru, the waters must have been kept at the same level as at Tertse, by the obstruction offered to their passage in the narrow channel between Chulung and Turtuk. This would account for the lines of straw and twigs being observed about half a mile from the present bed of the river.

The valley of the Indus, below the junction of the Shayok, narrows in some places to 100 feet, and even less. At these points, therefore, the flood must have risen to a height of sixty feet at least, and must have caused a considerable back wave up the confined channel of the Indus proper, or Lé river. And this was actually the case, for the effect of the inundation is said to have been felt for nearly thirty miles up the Indus, while at Sarmik, ten miles above the confluence, the lower cultivated lands were destroyed, and no less than 1,200 fruit-trees were swept away by the back-water flood.

At Skardo, where the river expands to 520 feet in width, and where the sandy flats rise at least thirty feet*

* Vigne, II. p. 260, states that water is found at a depth of ten yards.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

above the general level of the stream, it is probable that the flood did not spread much beyond the usual limits. The rise would, therefore, not have been more than ten feet. But below Skardo, in the confined and rocky channel, which is the prevailing character of the bed of the Indus throughout the Rongdo district, the flood-wave would have risen to its full height of sixty feet; and at the "Craggy Defiles" of Makpon-i-Shang-Rong, the curbed waters must have been massed up at least 100 feet in height.

At Ghori Trap, below Attock, where the width of the river is not more than 250 feet,* the wave of inundation must have attained a height of at least 23·79 feet; and this will at once account for the height of the waters at Attock, which are said to have submerged the fort of Khairabad by their sudden rise of nearly thirty feet.

From Attock to the sea the inundation pursued its ruinous course, but I have no information as to the extent of the country flooded, or the numbers of people swept away. According to the papers of the day, the devastation of the three Deras,—Ismail Khan, Ghaze Khan, and Fateh Khan, was very great; and I trust that full particulars of this extraordinary flood may yet be collected by some of the many British officers now stationed along the Indus.

VII.—THE JEHLAM RIVER.

The *Jehlam* river takes its name from the town of Jehlam, beneath which it flows. In Kashmir, it is called *Behat*, a contraction of the Sanskrit *Vitasta*, which the Greeks slightly altered to Hydaspes. The Jehlam drains

* Wood's Oxus, p. 125.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

XIII.—CATACLYSM OF THE SUTLUJ.

731 133 About midnight on the 26th day of the month of Kartik, and in the Sambat year 1819 (10th November, A.D. 1762), the shoulder of a vast mountain gave way, and fell from a great height headlong into the Sutluj. The slip took place in the neighbourhood of the hot springs at Seoni, about twenty miles nort h by west fom Simla, where the river is confined between precipitous cliffs that rise several thousand feet above the stream. The narrow channel was instantly choked with a vast mass of rock, earth, and rubbish, to a height of more than four hundred feet, and the stream for the space of forty days was so completely dammed that the water ceased to flow below the barrier. The bed of the Sutluj was reduced to a succession of deep pools, scattered amongst the huge boulders and angular masses of rock, and the people passed over with dry feet. The waters of the river accumulated till they rose nearly four hundred feet in height opposite the Rana's residence at Bhaji, and the effect of the obstruction is said to have been felt as high up the river as Rámpur, a distance of forty kos, or about sixty miles. At Bhaji, a lofty semal, or cotton-tree, which was half-submerged, is still pointed out; and as the height of this cotton-tree above the Sutluj is estimated by the Rana at 120 yards, the rise of the river cannot have been less than 400 feet.

A similar account was obtained by Alexander Gerard* in 1817, when numbers of people who had witnessed the flood were still alive. "About fifty-five years since, forty or fifty miles above this town (Bilâspur), an im-

* Kanawar, p. 53. Gerard says fifty-five years ago; that is, from A.D. 1817: which gives A.D. 1762, agreeing with my date.

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

mense mountain gave way, filled the bed of the Sutluj, and arrested the stream for six weeks. During this time the inhabitants were anxiously looking out for the bursting of the embankment. When it did give way, the rush of such an overwhelming body of water may be more easily conceived than described. People were stationed on the heights all along from the place where the stream was stopped as far as Bilâspur, and they gave notice of the approach of the flood by firing matchlocks. The news arrived in time to save the inhabitants, but the whole of the town was swept away."

731 133×

This account is not quite correct, for it was only the lower town that was swept away, as the houses of the upper town, including the Raja's palace, and several old temples, are situated on an elevated flat far above the reach of any inundation. The distance from Seoni to Bilâspur is not more than forty-five miles by the river, and about thirty miles by land. The wave of inundation would therefore have reached Bilâspur in three hours, at the rate of fifteen miles per hour, while the news of the bursting of the barrier could have been signalled by matchlocks in half an hour.

As my information is derived from the Rana of Bhaji, in whose principality Seoni is situated, I have full confidence in the general accuracy of my account, even including the statement that the bed of the Sutluj became quite dry for the space of forty days. At first I was disinclined to believe this startling fact, but a little reflection showed me that it must have been the case; for as the fall of the Sutluj in this part of its course is not more than twenty feet per mile, the accumulated waters must have filled the bed of the river for twenty miles before they attained a height of 400 feet, level

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

731 with the top of the barrier. To fill this gulf would have required the accumulated discharge of the river for about forty days. The minimum discharge being 5,400 cubic feet at Ropar, the discharge at Seoni in November cannot be less than 5,500 cubic feet. This discharge accumulated for forty days would have amounted to 19,008,000,000 cubic feet, a mass of water which would only just have been sufficient to fill the gulf in the bed of the Sutluj for twenty miles above the barrier to a mean depth of 200 feet, with an average breadth of 900 feet. The flow of the river must therefore have been quite stopped below the barrier for the whole period of forty days.

When the accumulated waters once began to pour over the obstructing barrier, the mass of loose earth and rocks must have been speedily cut up in all directions, until it soon yielded to the pressure of the mighty body of water; and the long-imprisoned river burst its fetters and rushed headlong down its rocky channel in one mighty wave, from fifty to more than one hundred feet in height This occurred on the fifth day of the month of *Paush*, or the 19th of December. Of its progress in the hills I know nothing more than what I have already quoted from Gerard of the destruction of the lower town of Bilâspur. But after reaching the plains, the mighty wave was swept more and more to the northward by its own speed off the Sewalik hills at Ropar, and thus took a new course under Phalor to the north of the old channel until it joined the Byasat Hari-ki-patan, where its further course to the northward was stopped by the stiff high cliffs on the right bank of the Byás. From this time the Sutluj, when swollen by the annual rains, continued to pour its waters down the new channel until

1: Cunningham G-3 (1846-47) 1854 AJ4 W. Tibetans AJ4

about A.D. 1790, when the whole body of water finally deserted the old bed by Lodiana and Dharmkot, and joined the Byás at Hari-ki-patan, some thirty miles above the former point of junction at Firozpur. For six months the Sutluj remained above its usual level until the rise of the river in June, when the last remains of the once mighty barrier were swept away by the swollen river.

The following table embodies all the principal points of information contained in the preceding pages.

	Rivers.	Length.			Fall per mile.		Discharge.	
		In Hills.	In Plains.	Total.	In Hills.	In Plains.	Min.	Max.
1	Indus Proper	1,035	942	1,977	15·4	1·06	16,500	
2	Shayok	400	—	400	26·4	—	2,000	
3	Zanskar	210	—	210	28·5	—	1,000	
4	Jehlam	380	240	620	21·0	—	4,000	
5	Chenab	380	570	950	40·8	—	4,550	54,000
6	Rávi	130	500	630	115·4	—	2,700	
7	Byás	150	100	350	48·0	—	3,000	
8	Sutluj	560	520	1,080	30·0	—	5,500	
9	Panjnad	—	—	—	—	—	12,000	100,000
10	Indus alone.....	—	—	—	—	—	15,000	130,177
11	Indus and Panjnad	—	—	—	—	—	27,000	230,177
12	Ganges at Ghazipur	250	1,500	1,750	52·0	0·66	21,757	476,761
	Ganges at Pubna ..	—	—	—	—	—	96,000	1,500,000

[34]

583 DOWER--rinto or zho or in the case of Mahomedans "mehr." The sum of money paid by the bridegroom to the father or other nearest male relative of the bride. The goods given to a woman on her marriage, including what we should call her "trousseau," and "dot" is called "raktak".

534 DRUM--denjang the big drum--body of wood and played upon like our big drums; dolti a brass drum like a kettle drum; daman a kettle drum; daps a drum played with the hands like a tambourine; daroo a very peculiar little drum used by lámas when dancing. It is shaped like an hour-glass and held in the centre, short strings with small pieces of wood attached to their ends are fastened on at either end; and when the hand is shaken these pieces of wood come in contact with the parchment heads of the drum, and thus sound it. There being several strings at each end, the sound produced is rather that of a rattle than of a drum. Denjang (or dolti, etc.,) rdung ches to play the drum.

[792]

278 DRUNKARD--rárospa or ráros or rároskhan. The Ladákis can not be called drunkards. They all drink chhang very freely, and frequently get very cheery in consequence, but even in their cups they are usually good tempered and harmless. They seldom get dead drunk. The expression zeekopkop chha ches signifies to be fuddled, or partially intoxicated.

439 [35]DYE--tshos the durable dyes of the country, rang the bright,
386 but not fast, dyes imported from India.

136 EAGLE--lák. The Chinese or Lhasa pug dogs are called "lák khee"
825 because it is believed that if a human being lays hands upon a young eagle, when freshly hatched, the bird is transformed into a dog of the Chinese pug breed.

291 EAR FLAP--hnaslan or noslan. The woollen lappets worn by Ladákí women over their ears. In shape and size they resemble the blinkers worn by a carriage horse. They are edged with fur and are plaited into the hair.

731 EARTHQUAKE--samgul. Ladákis think that the earth is supported,
823 in the midst of an ocean, on the back of a large fish, and that whenever this fish rolls about, earthquakes are felt. In

LADAK THEY ARE ALMOST UNKNOWN.

4 [I.E., BARLEY BEER -- ANALYST]

parents who are no longer able to work much or to help, and to assign to them a few fields for their livelihood. Often this reservation (property reserved for old people) turns out to be very scant, and the old parents are then forced to live a life of penury. 888

and for the grandmother Putrid, and apportioned them an ample amount of arable land from the yield of which his parents, who were still very active people, could live quite well. In the working of the fields, and in other respects, too, the son and grandson faithfully helped the old people who, in their turn, still assisted him as far as it was in their power to do so.

During this time Namgyal visited the missionary more frequently than usual. With him he read the story of Jesus from the Gospels. The reflective man was more and more strongly attracted by the person of Jesus. But he was still held by strong ties to Buddha and his teachings, and his regard for the powerful tribe restrained him from turning to Christianity in any decisive manner. 000

Now they had entered the Wood-Ape year. According to the various horoscopes constructed by the devil tamer and by the lama prophets, it was to be a particularly fortunate year for the entire country, and quite especially so for the house of the Dragshos. All the stars and astrological signs pointed to luck and prosperity, so said those wise men.

But again things turned out differently from the way they had been calculated by the wisdom of the prophets who, incidentally, had not been consulted by Namgyal but by the women of the house.

The winter from the Water-Sheep year to the Wood-Ape year was an unusually cold one, and one in which an unusually large amount of snow had fallen. The farmers' sheep and goats were in great distress because it was impossible to send them, as they usually did in winter, up the mountains for pasturing; and the little hay that had been gathered in autumn, was not even sufficient for the horses and the cattle. The traffic from village to village had been made difficult by the great masses of snow; some villages were completely cut off from any kind of communication with the outside; and the mountain passes were insurmountable. At the Sodshi pass, /191/ the entrance from Kashmir into Ladakh, three men, a postal courier and two companions, were engulfed in an avalanche and were killed. At Serkachan-La (pass) two men together with a loaded yak fell down the crack of a glacier 731

731 and could not be rescued. Driven by hunger, animals of prey frequently penetrated into the villages and carried off livestock wherever they could find it. The wolves and the wild dogs wrought particularly bad ravages among the villagers' sheep herds, so that the villagers scarcely dared to drive their sheep out for watering any more.

A very warm Spring brought with it the very sudden melting of the snow and great floods. The tiniest little brook was turned into a torrential stream, all the empty river beds and channels of the Ladákh wilderness were filled with water. In neighboring Domkhar, in Skyurbuchan, and in many villages along the Indus and its tributaries, torrential brooks and avalanches of mud tore away the farmers' laboriously constructed terraced fields together with the young seed. A mountain slide, caused by the melted water, dammed up the water of the powerful brook in the side valley of Domkhar, so that a large lake was formed. Two weeks later the dammed up floods had eaten their way through the dam; the water masses that hurtled down into the valley, destroyed all the best fields in the valley floor and high upon the slopes of the mountains; they tore open the bottom of the valley and carried down with them soil, stones, and large boulders, so that the floor of the valley was henceforth four to five meters lower than before; and the mills which before used to stand by the brook, now hung high above it along the wall of the valley, insofar as they had not been torn along. Two houses were carried off by the floods, and several cows, donkeys, and much small livestock perished in the inundation. Two women were also drowned as they were wading through a swollen brook.

In the early summer there were, contrary to all former experience, a great many violent thunder storms (165), such as the oldest

[132] 165. Thunder storms are rare and hardly ever violent in the high altitudes of Tibet (altitudes of over 3,000 meters). This is so because of the great dryness and minimal density of the atmosphere at these heights. For the very greatest part Tibet is a mountain wilderness. Its thin, dry atmosphere permits of only a slight formation of clouds and accumulation of electricity.

821 people could not remember ever having witnessed. In the fifth month there occurred an eclipse of the moon; the sixth month brought a total eclipse of the sun. Both astral phenomena created great agitation

among the Tibetans. By means of shouting, beating of drums, and firing of rifles they attempted to frighten the demon Rahu (sgra-can) (166), the furious enemy of the sun and moon (also according to 821

166 The dragon Rahu of Buddhistic and Hindu mythology has its counterpart in the dragon Nidhogg, a secondary form of the Fenri wolf of ancient Germanic mythology, who also threatens to devour the sun and the moon during their eclipse.

Indian belief), from devouring these good /192/ divinities who supply the earth with light night and day.

The superabundance of water in the spring and early summer was followed by a dry mid-summer. The masses of snow on the mountains had melted for the greater part, and for months on end not a drop of rain fell, even though the sky was frequently overcast and the air cool, during a period in which ordinarily there was a considerable heat spell. The seed on the fields that had been spared by the floods, which was just about to form into ears, dried up because there was no water available for irrigation. The snow remaining in the mountains and the glacial ice did not melt with the cool weather, the brooks carried only a little bit of water, and the water reservoirs were frequently empty. Namgyal had the Kalatse reservoir and water-line strictly guarded both day and night; and as village magistrate he punished several villagers with high fines of money, who had secretly and out of their turn conducted water to their fields; for this was, at that time, a crime committed upon the entire village community. 731 [689]

The lamas performed one procession after another, and the farmers carried the sacred books around all the fields; they prayed to all rain-bestowing deities, asking them to drench the thirsting land with rain. Everything was in vain. The coveted rain did not come; many brooks dried up completely, some only brought a little water into the valley late in the afternoon. At night there was frost in the high mountains, and the little melted water, ~~which~~ did not begin to flow down till around noon, had a long way to travel before it got down into the valley. A crop failure was to be expected. [789]

At the same time all kinds of sickness again went through the land, measles and scarlet fever, also a few cases of smallpox and typhoid, which frightened the people anew. The people of Ladakh wailed and cried to their "prophets," saying that they had prophesied a particularly fortunate year, and that in place of this they had been 787

787 afflicted with this terrible year of misfortune. The old devil-tamer soon had an explanation ready It is true, he said, that their prophecy had not come true. But this had its reasons. He and the lamas had not had a horoscope of the ex-king at hand, which influenced, so he claimed, the fate of the entire country even today after the dethronement, in a powerful way. Now they had just learned that the king was born in the Iron-Tiger year (lcags stag-lo) /Following page 192 there are two full-page illustrations, the first of "A Lharie (physician) with his medicine bag and medicine book" (subtitle); the second of a "Barber (Muslim) and knife sharpeners" (subtitle)./ /193/, and the present year was the Wood-Ape year, he pointed out. This conjunction meant of course conflict and disaster. For iron was the enemy of wood--the iron axe cuts the wood--and the tiger is the terrible enemy of the ape. No wonder, therefore, that the year had brought so much misfortune with it. If they had only had the king's horoscope at the time...

781 The lamas prayed and performed one ceremony after another. The people did not pay any attention to them, and did not call upon them any more, either. A dull despair settled upon the people, and many of them cursed the lazy drones in the monasteries. The people made more use than ever of the old magical processes which the oldsters in the village still knew from their ancestors. They threw barley and pills made of bread dough into the drying wells and brooks, as offerings to the water gods, and they exorcized the spirits of the earth by means of magical daggers and hoes that they stuck into the ground. They placed pentagrams made of sticks and wool threads, string crosses, and thorny twigs around their houses and on the roads, and recited ancient exorcizing formulas which no lama knew.

731 426 Finally, in the late summer, as the grain was standing, scarcely ripened and in thin ears, on the fields, the hot days came. At last the snow fields sent the long hoped-for water into the valley, the brooks and the canals were filled. But it was too late, to save the harvest. Many of the small-holders and small farmers were able to carry their entire harvesting yield home in two or three sacks. The specter of famine crept through the valleys. The grain containers of the poor became empty, and whoever still had some grain in store kept it back. Many rich people sold the grain which they had stored up for years at outrageous prices or else lent it at usurious rates of interest. The same was done by the lamas of the monastery Lamayuru, as well as by the village priest of Kalatse who belonged to this monastery, the lama Dondrub from the Break-leg house. With the grain collected

by them, the donations of pious Buddhists, they did business at huge profits. Chirpon in Tingmogang, Namgyal's father-in-law, also followed the example of these "spiritual gentlemen," in order to fill his money chest which during the past few years had been drained critically, since with increasing age he neglected his farm and gave himself over to drinking. Different was the behavior of his /194/ son-in-law Namgyal. He also lent out grain, but at moderate rates of interest; to many a needy one he gave grain from his own not very plentiful stock. His friend and teacher, the hermit Tsetan, did the same thing, helping the poor in distress and sharing with them that which pious admirers had donated to him.

Finally the Wasir (governor) even ordered his district officials to lend to the neediest grain from the government's granaries at moderate rates of interest; and in the worst cases to give it away in order to prevent the most extreme distress

Yet there remained much unrelieved distress; the distributions were also frequently carried out in an unjust manner. Many a timid poor man was overlooked, and many another one received abundantly because he had been able to win the favor of the officials.

Namgyal, the hermit Tsetan, and the missionary, these three friends, attempted to console the people, and they helped wherever they were able. However, the distress rested as too heavy a burden on the people's minds. Many were close to desperation, believing themselves abandoned by man and the gods. "Lanchags, lanchangs! It's retribution! And yet we know not what for!" the people said.

Sprin ak'or (Thunderclouds)

The autumn of this terrible year was ushered in with sunshine and glowing colors. The trees in the village oases shone in their yellow, green, and red glory, and up above the sky was resplendent with the gold of the sun and heavenly blue reflecting upon the mountains and slopes, upon glacier and snow peaks, painting them in all colors. But the people had no eye for all this autumnal splendor. The grey cloud of grief and anxiety rested heavily upon their minds. Winter was in the offing, and with it ceased every opportunity for the farmers to make money by means of carrier and transport services for the Indian merchants and officials. Also, many field terraces were still destroyed by the floods, and others lay covered under feet of avalanche debris. They lacked the strength and the courage to repair the damage.

6: Gazetteer G-5 (ca. 1840-1883) 1883-4 AJ4 W. Tibetans AJ4

133
361

Chapter I.
The District.
The Chandra and Bhága.

of 11,345 feet. Darcha and Khoksar, the highest villages in the upper valleys respectively of the Bhága and Chandra, are about 10,800 feet above the sea.

The source of the Chandra is in a huge snow-bed, more than 16,000 feet above the sea, on the south-east slopes of the Bára Lácha pass. From its very commencement a considerable stream, it becomes quite unfordable a mile from its source. Its course is south-east as far as the angle between the Kanzam range and the mid-Himalaya, a distance of 55 miles. Here, turned by the mountains, the river sweeps round to the north-west and skirts the base of the mid-Himalaya until it is joined by the Bhága at Tándi after a course of 115 miles. Its fall from its source to Tándi averages only 65 feet per mile. For the first 75 miles the valley of the Chandra is entirely uninhabited; the hills sweep down wild and barren to the river, and end in broken cliffs, the base of which is choked with the *débris* of decomposing rock. Above, the scene is equally desolate. Not a tree or a bush breaks the monotony of the bleak hill sides, and grass even disappears at no great height. The pasturage, however, though scanty in appearance, is of a quality much valued for sheep and goats, and is annually sought by large flocks driven up in July and August from Kúlu and even Kángra. A lake, called the Chandra Tal, near the Pálamo pass, is a favourite halting-place for the shepherds. The lake is three-quarters of a mile or more in length and of considerable width. It is fed by springs and the melting snows, and the surplus water runs by an outlet into the Chandra.

[311]

The first signs of permanent habitations are met with opposite the Hamtá pass at old Khoksar, where there is a village occupied by five families some 14 miles above Koksar at the foot of the Rohtang pass. Here "the river enters on a less uninviting country; the valley widens considerably in several places, and there is a good deal of cultivated ground on the right bank, while on the left are a few scattered trees." As Ghondla is approached the country on the northern side still opens, and cultivation increases. The hamlets are larger, and the houses better built, and surrounded with groves of *pípal* and willow. The northern mountains too take a gentler slope; but on the south, on the other hand, they hang over the river, in precipitous masses. Opposite Ghondla a precipice rises like a wall 11,000 feet sheer above the river-bed.

133
731

The glaciers of the hills in the interior threaten the river in more places than one. The most noted glacier is that known as the *big shigri** at the south-eastern extremity of the interior range of hills. A fall of this glacier in 1836 caused a stoppage in the course of the river, and a cataclysm, the marks of which are still plainly visible throughout Láhaul at a great height above the level of the river. Captain Harcourt, who crossed the glacier in 1869, puts its width at nearly two miles; and, he adds, it "is steadily subsiding, and every year is getting lower and lower". In another passage, after alluding to the cataclysm of 1836, he says: "There can be little doubt, judging from the quantity of ice collected on the flanks

* *Shigri* is the local term for any glacier.

of the mountains that bound the river, that at any day such a disaster may again occur."

6: Gazetteer G-5 (ca. 1840-1883) 1883-4 AJ4 W. Tibetans AJ4

132 Chapter I. The District. Climate of Láhaul.

No better place than Kardong could have been selected to show the average temperature of the inhabited part of Láhaul, but the differences of temperature are very great. In the upper part of the Chandra valley near Khoksar, the snow lies round the villages till the end of May, whereas in the valley below the junction of the rivers, the cultivators contrive to sow and reap two crops during the spring, summer, and autumn. The air is very pure and dry. Meat once dried will keep for any number of years. There is very little sickness of any kind, and goitre appears to be unknown. The influence of the monsoons is hardly felt. In July and August there are a good many showers of rain in the lower part of Láhaul, and for a few miles on both sides of the Rohtang pass, through which low gap a few clouds contrive to steal. But, generally speaking, there is almost unbroken cloudless weather in the summer half of the year, and indeed up till January, when the heavy falls of snow usually commence. In some years some villages are completely buried in snow. Avalanches fall in spring and summer, and occasionally cause serious loss of life. Not many years ago a glacier slipped and utterly buried a village in the mouth of the Yácha valley not a soul escaping. An old man who had gone up the mountain for some purpose a day or two before the catastrophe is reported to have said on returning that his heart misgave him that something was about to happen, as he had seen a band of strangely-dressed people dancing and holding high revel at the top of the glaciers, who must have been fairies. Of course the words of the seer were set at naught. According to Captain Harcourt, spring may be said to commence in Láhaul about the middle of April; frosts set in towards the close of September,

"though the three last months of the year are generally singularly clear and fine. By January dead winter commences, and from then till April the country is covered with snow to a depth of eight or ten feet, the villages in the higher altitudes being completely submerged." The cold even in summer is at times rendered "unendurable by bitter winds, which usually spring up after mid-day, blowing like a hurricane at 3 or 4 P.M., and only subsiding into a gentle breeze after the sun has set. The nights are invariably calm and quiet."

131 133 361 Configuration of *wazírí* Spiti.

Spiti is in shape a triangle; the side which separates it from Láhaul and Kúlu to the west being formed by the Kanzám ridge and the mid-Himalaya; the opposite side which separates it from Ladákh and Chinese Tibet, by the western Himalaya; and the base which separates it from Kanáwar, by that part of the mid-Himalaya which, under the name of the Mánirang range, runs along the north side of the Satlaj. The base measures about 58 miles, and a line from base to apex about 60 miles. The Spiti river rises in the apex of the triangle, and runs down its centre till it nears the base, where it inclines to the left and goes out at the north-east corner. In the south-west corner is the Pín valley, with its river of the same name, a tributary almost as large as the Spiti itself. Pín contains some eleven villages, and these are the only villages out of the main valley on this side, as the rest of the streams which join the Spiti from the mid-Himalaya, though of considerable length, flow in